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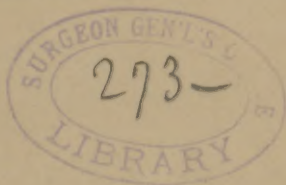
A Clinical Report of Cases
treated by Pneumatic
Differentiation.

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BY

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A CLINICAL REPORT OF CASES TREATED BY PNEUMATIC DIFFERENTIATION.*

BY HERBERT F. WILLIAMS, M.D.

It is with a full appreciation of the danger of becoming wearisome that I feel compelled to give somewhat in detail my further clinical experience with the pneumatic cabinet. Such suggestions as I shall deem proper will appear with the report of each case, the history and study of which may be said to have prompted them. For the establishment of any new device or procedure in the healing art, practical investigators are willing to accept the drudgery of compiling clinical results, for in this manner only can practical conclusions be reached which must establish the utility of the matter in question. It is with satisfaction that I have received from prominent men who have had the opportunity to examine many of the cases that form the basis of my first report assurance that my diagnoses were correct and my conclusions honest and not overdrawn.

In my original report in the "Medical Record" for January 17, 1885, results were recorded which have been termed "brilliant" by some enthusiastic believers in the differential process. Some careful men have feared that the appli-

* Read before the American Climatological Association at its third annual meeting.

cation to five advanced cases of phthisis of the term "recovery" might have created a feeling of incredulity concerning both the description and the describer, and endangered or delayed the development of this process. Had the continued application of this process by myself and others failed to corroborate those results, I feel that the uncommon precaution of having my diagnoses and results in those cases confirmed by competent observers, together with the moderate statements that are found in the closing paragraphs, would have saved me from the righteous oblivion that is meted out to willful misrepresentation or unpardonable incompetency and rashness. There seems to be no common understanding or agreement as to what constitutes a recovery in advanced phthisis, but the necessity for such a term sinks into insignificance when objective results are fully recorded. My determination to adopt these measures of confirmation was greatly strengthened by the reading of a paper by Dr. Sidney A. Fox, of Brooklyn, before the Kings County Medical Society, entitled "A History of Sixty-nine Cases treated by Pneumatic Differentiation," where in many instances I had the opportunity to examine his cases before and after treatment.

IN CASE I of my first report (acute catarrhal phthisis, stage of softening) the patient has been in good health up to February 1st of this year; weight 126 pounds. The last of January she attended a funeral on a cold and blustering day, and during the journey to the place of interment kept her feet warm by means of a heated foot-stove; was sufficiently imprudent to leave the carriage and stand by the grave during the recital of the burial service. A violent cold was contracted for which she did not seek relief until the latter part of February, and then on account of a hæmorrhage which occurred in the night, induced by great violence in coughing.

The inheritance of phthisis in some is an inheritance of carelessness and indifference. Though this patient had a

phthisical mother, she is the personification of carelessness, whether inherited or acquired. She again commenced treatment March 15th; her weight had declined to 115 pounds; high evening fever, constant cough, and profuse expectoration which contained bacilli. Her physical signs gave evidence of acute phthisical degeneration. She took eight treatments, but the journey from her home in Brooklyn to my office in New York seemed to exhaust her, in consequence of which she was placed under the charge of Dr. Fox and Dr. Brown, of Brooklyn, from whom she is now taking treatment; but her progress is slow, and there are grave doubts of arresting the phthisical process.

On September 5, 1883, this young lady was considered to be in a hopeless condition by five careful physicians who then examined her. At this date her treatment by pneumatic differentiation began, and as a result she has had over two years of immunity.

CASE II.—(Phthisis, third stage.) Patient remains in good health; has had one or two colds this winter and coughed a little in consequence; has received no further treatment.

CASE IV.—(Abscess of left lung, producing extreme exhaustion, with primary changes taking place in right lung) Patient in the same condition as last reported; well, with exception of slight fistula in side.

CASE V.—(Acute bronchial catarrh with sub-epithelial abscess and peri-bronchial inflammation.) Patient was at last accounts driving an ice-cart about the city. He has had one severe hæmorrhage since last report, from which he fully recovered without serious lung change taking place.

The seven patients with primary infiltration are well with the exception of two. Mr. F., whose family history is phthisical, remained well until June, 1885, a period of about eighteen months, when he was seized with a severe hæmorrhage after prolonged exposure to the hot baths of Salt Lake City

He returned to me for treatment in October, 1885, remaining a month, and is now living in Rondout in good condition. Mr. M., the other, whose case was No. 3 of my original report, has been depressed by business disappointment and increased domestic responsibilities. He has taken seasons of pneumatic treatment under the care of Dr. De Watteville, of New York, who reports him at present in an improved condition, though he notes a steady decline from year to year. From June 12, 1885, up to the present time, I have treated forty-five additional cases of pulmonary disease by this process.

Of these cases I will give as concise a report as possible consistently with the particular phase that each represents, and the hints for treatment that each suggests.

CASE I.—M. B., bachelor, gentleman, a high liver, aged sixty-one; best weight 140, present weight 105; expansion one inch; no history of phthisis; in delicate health for two years. Pain in left scapular region; slight exertion produces great distress for breath. Has traveled extensively in search of health. Expectorates profusely and coughs incessantly.

Physical examination shows respiratory movement in left side restricted; emaciated, flatness of clavicular spaces; percussion shows high pitch in left side, most marked in upper portions, but resonance defective throughout. Auscultation shows feeble respiratory sounds on right side. Left side broncho-vesicular, cog-wheel; prolonged expiration; deep-seated râles.

Received nine treatments (iodine in spray), covering a period of one month, at the end of which time his expansion had increased to one inch and five eighths; cough relieved, expectoration easy and less; walks about with comfort; weight increased. Started for Denver, where in three weeks his weight had increased to 120 pounds. This case shows the benefit that follows a thorough expansion and the more marked improvement that follows climatic influence in consequence of increased respiratory power. This patient is in a fair condition to-day, though incapable of recovery.

CASE II.—(Referred by Professor A. L. Loomis.) Mr. L., aged forty-four, married; best weight 125, present weight 110; family history clear; dyspeptic for several years; asthma for twelve years, slight at first but increasing in severity every fall, when he has had attacks of acute bronchitis. One year ago had pneumonia with slow and imperfect resolution; can not lie down at night, sleeps poorly, no appetite.

Physical examination shows increased resonance in both lungs, with exception of scapular region of right, where it extends to the axillary region; there is high-pitched percussion; increased area of cardiac dullness. On auscultation, the respiratory sounds are not so strong as the percussion note would indicate. The inspiratory act of right lung is attended with fine crepitation, which is superficial. There are mucous and dry râles interspersed through both lungs. Treatment began June 22d and continued at first tri-weekly, then once a week. He now appears occasionally; spent the fall and winter in complete comfort; his asthma is greatly relieved; his crepitation gone; a spray of chloride of ammonium with tincture of stramonium was generally used; his weight to-day is $118\frac{1}{4}$, within $5\frac{3}{4}$ pounds of normal; has taken in all forty-seven applications with an average rarefaction of $\frac{6}{10}$ inch. At times he is simply allowed to inspire, at others to complete the act into the outside atmosphere.

CASE III.—(Referred by Professor Henry I. Bowditch, of Boston.) *June 23, 1885.*—Mrs. C., aged forty, married; grandfather died of quick consumption; best weight 115, present 91. Evening temperature 100° ; expansion $1\frac{1}{4}$ inch; in good health until two years ago, when she had pneumonia from which she has never recovered. She has a hacking cough which prevents continued conversation; since January slight exertion provokes coughing; she can not go up or down stairs with ease; complains of great pain in left lung; expectorating freely; estimates quantity at one half cupful daily; appetite poor; menstruation scant.

Physical examination shows emaciation and extremely feeble respiratory movements. The percussion note is normal in right lung; the left shows dullness in subclavicular region near clavi-

cle; the note is of varying character in different regions of this lung, but there is a general absence of normal resonance. Auscultation shows a fair vesicular murmur in right lung, but the left is irregularly broken down, gurgles being easily demonstrated in the clavicular space; there are no respiratory sounds in the lower lobe. This patient took daily treatment covering a period of five weeks, taking in all thirty-two treatments; rarefaction increased from three tenths to eight tenths, and occupying from fifteen to twenty minutes daily. Iodine and mercuric bichloride were used in spray; marked amelioration in cough, and diminished expectoration; increased ability in walking; reads aloud with comfort; expansion increased one half inch; weight, ninety-six pounds. Physical examination shows increased circulation of air in the left lung, including the lower lobe, though the upper portion remains the same as before, with the exception of diminished quantity of gurgles; this patient was last seen since January 1, 1886, when she professed a continued improvement, though no examination was made.

CASE IV.—Mr. P. This gentleman I knew personally for ten years, having been his family attendant during this time. On July 15th he appeared at my office and complained of symptoms which pointed to an enteric disturbance, which the warm season for several years has produced. For three years in succession he has suffered from dysenteric symptoms that have confined him to bed from two to three weeks. To forestall this, I instructed him to go home and to bed, where I attended him for several days. He complained of little pain in his left side; his temperature was 102° every afternoon, and resisted my best efforts at reduction. We had succeeded in preventing his diarrhoeal trouble, but his continued fever and growing weakness demanded a further examination, which was made July 25th. He never complained of a cough, and there was literally nothing but the slight pain in his left side to point to the disclosures of his left lung, which I found to give evidence of consolidation. Regarding this as suspicious of a low grade of pneumonia, or rapid and general tubercular infiltration, I made arrangements to give him the benefit of the pneumatic treatment, which were completed July 30th, at which time his condition was as

follows: Mr. P., aged forty-two, married, machinist, best weight 150, present 136, temperature 101° , expansion one inch—all on right side. Father and two sisters died of phthisis; pale, anæmic, and emaciated; respiratory movement of left side confined to a heaving movement of scapular region; no movement in the lower left thorax; the percussion note showed good resonance in the superior portion of the left lung, extending to the third rib; the mammary portion and posteriorly, from the spine of the scapula, it was of high pitch and short duration; right side showed increased resonance; auscultation gives normal vesicular murmur in superior portion of the left lung, front and back; breathing bronchial over lower portion of the scapular region. The sounds are indistinct below this point.

He was submitted to treatment, using one-to-five-hundred mercuric bichloride in spray, and at his first application breathed easily against six tenths rarefaction, the major part of his breathing being done with his right lung. Auscultation showed no evidence of deeper penetration of air, and no diminution in the bronchial breathing. Auscultation while breathing in the cabinet revealed a perceptible change in the character of the sounds, which were, at least, broncho-vesicular. The following day examination immediately before treatment revealed bronchia, breathing. Immediately after, the breathing for one or two respirations was broncho-vesicular, but rapidly changed to bronchial during auscultation. It should not have required this demonstration to clear up my original diagnosis; the left thorax was demonstrated to be at least half full of pleuritic effusion. The increased expansion of the lung by the normal air caused an even distribution of the effused fluid in the thorax, and the respiration became vesicular. Upon leaving the cabinet, the lung was quickly pressed up against the superior thorax, partly by its own contractility, but principally by the gravitation of the effused fluid. Now the respiration became bronchial. Ninety-six ounces of serum were withdrawn by aspiration, requiring three operations at intervals of forty-eight hours.

In two weeks from this time patient again commenced treatment. After ten applications there was an even expansion of the lungs. There still remained a deficient percussion note in

the lower left axillary region. In October he resumed his work, having gained nearly his normal weight and strength. On December 25th he was seized with a chill while sitting near an open door. On December 30th a general pleurisy of the right lung was detected, for which he was actively treated. This attack was characterized by violent symptoms, and resisted every endeavor to control fever and conserve his strength. Forty-grain doses of quinine would reduce his temperature from 105° to normal, but only temporarily. January 28, 1886, his respiratory sounds became coarse and harsh; cough had never been a prominent symptom, and he had scarcely any expectoration. Bacilli were now for the first time detected; he was made to abandon all hope of being able to resume cabinet treatment. February 5th his condition was hopeless; but, as a last resort, ten minims of cultivating fluid, containing the sixth and seventh generations of *Bacterium termo*, were subcutaneously injected, the injection being repeated twice at intervals of six hours. A diffused redness about the points of puncture was the only disturbance noticeable.

This procedure was justified by the absolutely hopeless condition of the patient, the certainty of an autopsy, and the hope that the latter might yield some further light upon the questions of bacteria therapy now exciting interest in foreign biological laboratories.

On February 8th he died. On the 9th an autopsy was made by Dr. A. H. P. Leuf. The right pleura was covered with plastic lymph, with recent adhesions. The superior lobe was infiltrated with miliary tubercles; the left lung was attached at its lower border by old adhesions and a thickened pleural sac containing about two ounces of fluid. The left apex contained tubercles, but less profuse than the right. No effusion in right thorax. Microscopic examination of lung shows enormous quantities of *B. termo*, but no apparent diminution of the specific bacilli. This case is given in detail for two reasons: First, it demonstrates the necessity of not allowing our preconceived conclusions to persist when careful physical exploration discloses their fallacy. Second, a pleurisy with such a history points to a tubercular dyscrasia, which a prompt and thorough

disinfection arrested. This is proved by the comparative freedom from tubercular infiltration of the left lung, which five months previous had been the seat of an inflammatory action similar to the subsequent attack on the right lung, where efficient disinfection could not be employed by reason of patient's inability to get to the cabinet.

CASE V. — (Referred by Dr. Woodside, of Williamstown, Mass.) Miss A. D., aged twenty-four, unmarried, best weight 117, present 107, expansion two inches, immediate family history clear, paternal uncles and aunts died in early life. Sick since August, 1884; early cough and hoarseness; hemorrhage in November of same year, which was not controlled for a week. Sent South in January, 1885; remained four months, with improvement, which was maintained up to the latter part of August, when she caught a fresh cold, which has aggravated her symptoms. To-day, September, 1885, her condition is as follows: Appetite poor; coughing, especially at night and morning; expectorating yellow matter; shortness of breath; pale and anemic; chest thin and emaciated; lack of normal motion left side; fremitus most marked right side. Percussion note high pitch; in outer clavicular angle of left side, over right apex, front and back, the note is high pitched. On auscultation, both lungs in front the respiratory sounds are harsh; fine crepitation accompanies the first half of the inspiratory act; outer right pectoral region there is a prolonged expiratory murmur on both sides; left side scapular region, respiration is broncho-vesicular, coughing producing fine crepitation in right clavicular space.

This patient received thirteen treatments, with an average rarefaction of six tenths of an inch, using the mercuric bichloride in spray alternately with a solution of iodine. She was allowed to reside in Bloomfield, N. J., taking the train to New York, a distance of fourteen miles. There was no improvement, excepting in expansion and a slight diminution in expectoration; her weight decreased two pounds, and, under the above circumstances, further treatment was considered of doubtful value. On her return to Williams-

town, Dr. Woodside noted a deeper and freer penetration of air. This case is reported to show the necessity of making proper arrangements as to access to the cabinet before commencing treatment.

CASE VI.—Mrs. B., aged thirty-five, best weight 135, present 122; expansion one inch and three quarters; one brother died of hasty consumption, aged thirty-five; trouble began in spring of 1885, with cough, rapid emaciation, and night-sweats; was sent to the Catskills by her physician in June; remained eight weeks. The month of September was spent in Morristown, N. J. Physical examination October 25, 1885. Sallow, anæmic, evident emaciation, feeble respiratory movements; can not go up or down stairs or walk fast; fever at night; expectoration profuse, but heavy and difficult to raise; cough very troublesome; menses scant and irregular. Percussion, right side, normal; left, there is cracked-pot resonance, in middle of infra-clavicular space. Auscultation, right side, sounds are harsh, cog-wheel, with prolonged expiratory murmur; left, cavernous breathing in middle apex, with gurgles; the excavation extends to third intercostal space. This case has been under treatment up to March 31st of this year, taking in all forty applications with an average rarefaction of eight tenths of an inch, with sittings of from fifteen to twenty minutes; the treatment was sometimes supplemented by the method of artificial respiration (*i. e.*, placing the valves at D and vibrating the air from plus to minus the weight of the normal atmosphere). The mercuric bichloride was used for the first fourteen applications, afterward tr. iodine, five-per-cent. solution; her weight has increased to 133 pounds—within two of her best previous weight; no retraction has taken place in the left side; she has periods of coughing and expectoration, and small gurgles are still detected in cavity, which is reduced in size and becoming irregular.

It is too early to predict a recovery in this case. Yet, in the light of past experience, continued treatment should, I believe, produce ultimate quiescence of her symptoms. In justice to the cabinet, it may be noted that this patient has

taken no other treatment except occasional prescriptions for relief of incidental symptoms not directly pulmonary.

CASE VII.—In this case I will give an exact transcript of my examination notes. October 7th, Mrs. A. G. F., married, house-keeper, aged thirty-two, mother of three children. Best weight 138 pounds, present weight 122½; pulse 112; temperature, 2.30 p. m., 101°, expansion one inch. Family history: Mother died of uterine trouble; father living. Personal history: Two years ago commenced with hacking cough; night-sweats; has been to many physicians, Dr. Leaming succeeding in abating the symptoms; last summer, after taking cold and attention to sick child, the trouble started afresh. At the present time has pain in left side, coughing, "raising phlegm" with difficulty; night-sweats, chilly toward evening; can not go up stairs; no appetite and dyspeptic; constipated; menses irregular and scant; phlegm greenish; cough so violent that vomiting is produced. Inspection shows large full eye, with blue sclerotics; anæmic; flesh flabby; emaciated, with clavicular depressions; tongue red; respiration 26 per minute, feeble respiratory movements. Palpation apparently normal on right side; left absent.

Percussion.—Lack of normal resonance in both supra-clavicular spaces. There seems to be no abnormality excepting in the subscapular, axillary, and submammary regions of the left side; here the note is high pitched; the point of greatest flatness is at the junction of the axillary and subscapular regions.

Auscultation.—The inspiratory murmur in both infra-clavicular spaces is harsh and wavy. Deep inspiration produces annoying cough; in the supra-clavicular spaces there is broncho-vesicular respiration; there are moist râles on the left side in the subscapular and axillary regions. Treatment began October 7, 1885, and continued until December 19th, taking nineteen applications. Bichloride of mercury was alternated with iodine. From six to eight tenths rarefaction was maintained for fifteen minutes at each sitting; for the last six* applications artificial respiration was used. On December 19th every symptom had abated. All her functions normal; weight 128 pounds. March 11, 1886, has caught a fresh cold and returns for treatment.

Her improvement since December 19th has been phenomenal; she now weighs 154½ pounds; has remained in the city all winter in perfect health; thinks herself in the third month of pregnancy.

On April 28, 1886, I called on Dr. Leaming with reference to this patient. He authorizes the statement that, when he last examined her in July, 1885, he found an extensive inter-pleural plastic exudate of the left lung, and that the diseased process had extended into the lung tissue.

CASE VIII.—Miss M., aged twenty-five, unmarried; best weight 120; present 101; father died of phthisis and Bright's disease, aged fifty-eight; mother, of phthisis, aged thirty-nine. Has been sick two years with the usual symptoms of progressive phthisis; has been taking cod-liver oil, hypophosphites, and general tonic treatment. She is now coughing and expectorating, has evening fever, emaciation, marked clavicular and intercostal depressions. Percussion shows high-pitched note in outer sub-clavicular space of right lung; over left apex, extending to the second intercostal space, the note is high pitched. Auscultation shows broncho-vesicular respiration in the right apex. Left apex near sternum gives irregular respiration with gurgles and surrounding bronchial respiration. Microscopic examination shows bacilli. Treatment began October 31, 1885, and has continued up to April 19, 1886, coming every day for first ten applications, then thrice weekly. At present once a week. The stronger antiseptics were used. She has maintained her weight during the winter, and now weighs 103 pounds. The auscultatory sounds show sonorous râles and rhonchi, but the former evidence of small cavities is wanting. Her sputum shows absence of bacilli for the last two examinations, covering a period of four weeks. Enormous quantities of bacteria that can not be distinguished from *B. termo* are found.

CASE IX.—(Referred to me by Dr. Mary Putnam Jacobi, November 6, 1885.) G. P. S., aged thirty-nine; one sister and one paternal aunt died of phthisis; has been under Dr. Jacobi's care for some time, using, with other treatment, the compressed-air

method of Waldenburg. The necessity for this was a severe congestion of the right lung in February, 1885, which confined patient to the house for three weeks. Dr. Jacobi's notes of the physical examination are as follows :

"Right lung superiorly, relative percussion dullness from clavicle to third rib, ordinary respiration feeble; in forced respiration, inspiration is suddenly checked at close, then weak sound during expiration, not like tubular breathing, but suggesting the forced expansion of an adherent pleura. Posteriorly, supraspinous space, inner half, ordinary respiration gives wavy inspiration; forced respiration gives soft tubular expiration. Outer half, soft pleural crackling, which extends down to outer half of the scapular region, encroaching a little on the axillary space, heard distinctly at ordinary respiration, more at forced respiration; heart is normal, though pulse easily 87. There is sugar intermittently in the urine; patient was a week ago in the midst of an acute bronchial catarrh, from which undoubtedly your treatment should give relief, whatever may be done for the chronic pleurisy." The treatment was begun November 10th, and was continued uninterruptedly tri weekly until December 10th; rarefaction was the force employed, and six to eight tenths the amount maintained for fifteen to twenty minutes. Tr. iodine, five-per-cent. solution, diluted with extract of pine needles, and glycerin sprayed.

My notes of this case show a rapid improvement of the symptoms, which are further confirmed by a note from Dr. Jacobi dated December 7, 1885: "I find the patient much improved. The bronchitic attacks really seem entirely cured, and more air enters the upper part of the lungs under the clavicle. I still find the traces of the chronic pleurisy, and indeed should not expect that to disappear." On February 2, 1885, Dr. Jacobi writes as follows: "The patient you treated for me, I think, in November, 1885, and who rapidly improved under the use of the cabinet and spray, seems now entirely well. Has been living in the country; has used the Waldenburg at home to continue the effect of compressed air, and a respirator in the city to avoid the irritation of the city dust; has had no cough since, and I find to-day that the pleural crackling has about disap-

peared. Has resolved, in case of a fresh attack of either bronchitis or pleurisy, to return to you at once, and this I have advised."

CASE X.—(Case referred by Dr. Fowler, of New York, Dr. Loomis concurring.) Mr. W. S., clerk, aged twenty-eight; best weight 150, present 124½; pulse 110, temperature 101°, expansion one inch. Early mortality in seven paternal and five maternal aunts and uncles, but no satisfactory evidence of phthisis. Three years since was ill with pleurisy, left lung; one year ago pleurisy right lung.

March 20, 1885.—Had croupous pneumonia, right lung; this has never resolved, now coughing and raising; hectic; no appetite, extremely weak, progressive emaciation, respiratory movement extremely feeble, nil on right side, fremitus increased right side. Percussion over middle and lower lobe of right lung extremely high-pitched (flat); careful percussion in clavicular spaces fails to give a full normal note. Auscultation shows on right side a loss of vesicular element in clavicular spaces; respiratory acts are short, and, the lower down we listen, the less distinct they become. The inspiration is faintly bronchial and attended with fine crepitation over the lower posterior border and axillary space; left shows sibilant râles in upper lobe.

Treatment began November 12, 1885, with two tenths rarefaction, but, on account of the great weakness of the patient, it became necessary to use the artificial respiration; by the 18th he was able to maintain a rarefaction of six tenths, inhaling a solution of ammonium chloride, glycerin, and carbolic acid; afterward the tincture of iodine and pine-needle mixture was used; he averaged four to five treatments a week, and up to December 30th had taken twenty-five applications; his examination now shows a freer expansion of his right lung, and the bronchial respiration had become more pronounced; his expansion had increased to two inches and a half, and there was some diminution in the number of moist râles in the right lung; his weight declined two pounds, but he was stronger and took a walk of three quarters of a mile on January 1, 1886; his improvement was temporary, however, for he was confined to

his room for the month of January. In February he commenced treatment again, taking nine treatments, but no improvement followed; his sputum had shown at all times bacilli in enormous numbers.

CASE XI.—Dr. J. D., of New York, has kindly sent me a report of his own case, which I submit verbatim:

"Age twenty-seven; physician; father and two cousins on paternal side died of phthisis. Healthy until July, 1880, when I suffered from pneumonia, being at that time in a run-down condition due to over-work. Pneumonia was very slow in resolving; during fall and winter of 1880 had three attacks of hæmoptysis; by spring of 1881 all symptoms of lung disease had disappeared, and until the early part of 1884 I was entirely free from pulmonary troubles. At this time I contracted a cold, and the cough persisted in spite of treatment. During the following winter I had two very slight attacks of hæmoptysis; chest was examined at this time, and gave evidence of catarrh of smaller bronchi; spent February and March at Hamilton, Bermuda, but did not derive the expected benefit which I sought, and suffered from the enervating effects of the climate. During August and September, 1885, sojourned in the White Mountains and gained but a few pounds in weight; returned home somewhat discouraged; having heard a paper on the treatment of phthisis by pneumatic differentiation, read by Dr. H. F. Williams at the meeting of the American Climatological Association, I determined to try the method. In October, 1885, I called on Dr. Williams, who kindly put the apparatus at my disposal. At the time of commencing treatment a physical examination showed some catarrh of the finer tubes; a small area of diminished respiration at the upper portion of the left lung. I coughed all day; cough accompanied with expectoration.

"For the first few weeks used the cabinet three times a week, and later once a week. After the first few *séances* the cough diminished, and in three months had stopped entirely. In a month from beginning treatment had gained five pounds in weight.

"Preliminary and subsequent examination was made by Dr.

J. H. Ripley, of New York. Latter examination shows nothing but small area of diminished respiration and slight emphysema. The latter condition was noticed before this treatment was commenced.

“Very truly,

J. D.”

The doctor omitted to state that for his emphysema he was subjected to two inches pressure in the cabinet and expired into the normal air, from which he frequently experienced relief and benefit.

CASE XII.—Miss E., aged twenty; best weight 135, present 117; temperature 102° , P. M.; expansion $1\frac{1}{2}$ inch; spirometer 30; is ignorant of any phthisical history; father and mother dead. One year ago took cold, from which did not recover. Has been under treatment, using spray, etc., since hoarseness commenced, which was an early symptom; at present voice is very husky, coughs constantly; expectorates yellow and greenish matter, sometimes mixed with blood; averages two cold sweats per week; very short of breath; percussion note is high-pitched in clavicular region of right lung; point of greatest intensity at junction of sternum; note is also high-pitched at outer clavicular angle of left side; auscultation gives a bronchial, harsh, and wavy respiration in upper anterior lobe of right lung; moist râles in profusion on coughing. There are sibilant and sticky râles below point of bronchial breathing; in the left lung the respiration has lost its vesicular element; there is also evidence of pleuritic attachment. Treatment began December 1, 1885, and continued every other day up to December 18th, taking in all ten applications; tincture of iodine sprayed; five to eight tenths rarefaction used. Patient professed improvement at the fifth application, and the respiratory sounds seemed clearer, but the cough, expectoration, and fever did not abate. On December 18th there was no substantial benefit noted, when I advised the suspension of the treatment. Two weeks later she was visited at her home; her lungs were congested, bronchial respiration was more marked than ever, and her fever had increased.

Whether the fever was increased by the use of this method or not, the coincidence at least was striking. There

may be conditions where the accidental point of breaking down is in close proximity to the pulmonary lymphatic system, and any considerable force exercised, as in this case of six tenths rarefaction, would tend to more rapidly disseminate the particular virus into the general circulation, and thus more rapidly bring about the necessary conditions to infect the nervous centers that control bodily heat. This is a fair conclusion in this case, though it may be an incorrect one.

CASE XIII.—Mrs. L., married, aged thirty-three; best weight 150, present 138½; temperature normal; expansion 13½ inch; spirometer 150; no history of phthisis; had uterine trouble before marriage; a cough first developed shortly after the birth of a child, one year ago, which has never entirely disappeared; has recently recovered from a severe prostration consequent upon a hæmorrhage following a retained placenta of a three months' miscarriage; has been up and around for the last month; her general condition improving, but her cough growing more severe and expectoration increased; very anæmic, sallow; exertion produces dyspnoea; fremitus increased on right side anteriorly; percussion on right side reveals high-pitched note in clavicular spaces extending to fourth intercostal space. The note is not full in axillary region of left side. Auscultation, right lung; the respiratory sounds are feeble. Forced, they become bronchial with moist râles; in the left upper lobe in front the respiratory sounds are harsh and cog-wheeled in character. Treatment began December 10, 1885, and continued with great regularity up to January 26, 1886, taking in all thirty-one applications. Rarefaction from four to eight tenths. The agents used in this spray at different times include mercuric bichloride, carbolic acid, ammonium chloride, tincture of stramonium, cocaine, morphine, and iodine. A steam spray was used for a time instead of the compressed air-blast. Artificial respiration usually supplemented the sitting, which averaged from fifteen to twenty minutes in duration. My daily notes show various and conflicting statements, but no steady improve-

ment is recorded. At times she would complain of sharp pleurodynia, and, strange to say, sought the cabinet for relief of this. The mornings after inhaling the iodine the sputum gave a blue reaction upon her handkerchiefs. Her weight, up to January 26th, had not declined, and her temperature remained normal, yet her cough continued, and the result of the treatment has been negative.

CASE XIV.—(Referred by Dr. D. C. Dellenbaugh, of Cleveland, Ohio, who in his letter records a morning subnormal temperature and cites the case as a "typical example of phthisis following upon pneumonia, involving nearly the whole of the right lung"):

R. C., aged twenty-seven, single; best weight 138 pounds, present weight 120½; no phthisical history; "cold one year ago"; confined to bed; coughed ever since; expectoration very free and heavy. For last six months night-sweats; coughs so violently that he vomits; can not take exercise without loss of breath, feeling very weak; abnormal blueness of face and hands, emaciated, deep temporal fossæ, retracting right chest almost a deformity; intercostal depression. On percussion of right anterior upper and outer angle, the note is woody in character; in the scapular region it is of higher pitch than on the corresponding side; the left supra clavicular space fails in normal resonance.

Auscultation.—Cavernous respiration in right outer apex, extending toward the axillary border; large gurgles; inspiration accompanied with fine râles in mammary region; sputum contains bacilli. Began treatment January 25, 1886, and has continued up to April 17th, taking in all thirty treatments. Took treatment every day for first ten applications, gradually declining in frequency until finally he came once a week. The mercuric bichloride was used (1 to 500), varied at times with the iodine solution, to which eucalyptol was added. Examined April 17th; the cavity has become nearly quiescent; there are no moist râles in mammary region; he estimates the quantity of sputum at two thimblefuls a day; his weight is 127½ pounds.

CASE XV.—Sent by his physician, Dr. Guild, of Ware,

Mass., who kindly appends the following history: Mr. G., aged forty, unmarried, temperate; one uncle afflicted with asthma; five or six years ago, after a succession of colds which were easily contracted, he complained of shortness of breath; suffered with hay fever from 1870 to 1879; after this and at the time of the beginning of the asthmatic seizures the hay fever did not appear; can not go near a stable without exciting an asthmatic attack; generally free from asthma while in New York. He is convinced that the locality of his native town (Ware, Mass.) is prejudicial to his case, which is strengthened by his uncle's experience, who could not reside in comfort at home. The physical signs show extreme resonance; auscultation shows absence of vesicular murmur with sibilant râles; heart-sounds heard with great difficulty. There are bronchial and some moist râles.

First treatment February 22d; rarefaction four tenths, with ammonium chloride, for the relief of the bronchial catarrh. The sitting ended by artificial respiration. For the last fifteen applications compression was carried to two inches in the cabinet and the patient allowed to expire into the normal air, inhaling the air of the cabinet. In this way he repeats this act ten to fifteen times a minute. He has taken twenty-eight applications in all; has increased his respiratory power; his heart-sounds are audible; has had no attack since commencing treatment; is now in Ware to determine the effect of the treatment.

CASE XVI.—T. F., aged thirty-nine, physician, gives the following history of his own case, and the benefit he derived from a few treatments with the pneumatic cabinet:

"Was attacked with acute pleurisy in July, 1883, slight effusion, etc., followed by cough and prostration, and was confined to the house until May, 1884; then began to improve rapidly, and, by the advice of my physicians, spent the summer in the Adirondacks, and the following winter in southern Georgia; again last summer went to the Adirondack lakes, and in the autumn resumed practice. As far as I know, my only trouble has been pleurisy with its sequels; family history very good; in April, 1884, my chest had contracted four inches (from 38 to 34 inches); weight reduced from 166 to 146 pounds.

"In December, 1885, at the suggestion of my physician, Dr. T. A. McBride, of New York, I applied to Dr. Williams to try the effect of 'pneumatic differentiation' upon my contracted chest. During the time from May, 1884, to December, 1885, my chest measurements only increased one inch, although my weight increased ten pounds; with this condition of my chest I had relatively limited expansion and accelerated respirations, with more or less pain constantly. I think I received in all ten treatments; at first two a week, later one only every week. The result of these treatments has been an improved respiratory mobility; respirations less rapid and deeper; am able to sleep equally well on either side (previous to my first visit I was unable to sleep on my left side), and almost entire freedom from pain in thorax.

"I think that the thorough expansion of the lungs by differentiation has been of great therapeutic benefit, and with the start this measure has given me I have been able to take a large amount of out-door exercise, and a steady improvement has resulted.

Yours truly,

T. S."

In these sixteen cases rational auxiliary treatment has not been withheld, nor has it been essentially different in any case from that which had been instituted before coming under my care. In most of the cases I have advised an occasional return for treatment, and an immediate return in the event of taking cold. While these results are largely due to the benefit of expansion and thorough blood aeration, and the consequent stimulation of appetite and assimilation, I think the undoubted influence of deeply introduced medicinal agents in some of the cases must claim a share of the credit.

I can not longer trespass by an extended reference to the remaining twenty-nine cases. Many of these would furnish data like those reported; while none can show a gain of thirty-two pounds, as in Case VII, none have as signally failed as Case XII.

In response to an invitation from me, many of those physicians using the cabinet have forwarded me reports and conclusions gained from their experience with it. With their permission I append them.

From Dr. Classon and Dr. Clarke, of Albany :

" We send you a report of one case in which we expect recovery by cabinet treatment. We expect favorable results in two other cases, but it is too early to say decidedly yet; improvement has followed in three others. G. L., aged nineteen, clerk; weight 139 pounds; single; one sister died of phthisis, aged eighteen; had a hæmorrhage one year ago, followed later by two slight ones accompanied by cough, loss of weight, and recently by night-sweats; expectoration mainly mucous.

" *Examination*.—Percussion; slight dullness over upper half of both lungs, extending a little farther down on right than left side; more marked on upper right side; increased resonance over lower part of both lungs.

" *Auscultation*.—Fine mucous râles over same portion of lungs as dullness; respiratory murmur diminished over upper half of both lungs, and exaggerated over remaining area. Broncho-vesicular respiration over circumscribed area in posterior upper half of right lung (infra-scapular region).

" *Treatment*.—After fourth treatment, began to improve; after sixth, marked improvement, coughing only in the morning; râles clearing up, dullness disappearing, and respiratory murmur becoming more distinct. At the end of the fortieth treatment the left lung was nearly normal; the right still gave the same sign, though less marked in the extreme upper portion—that is, in the supra-scapular region. The remainder of the lung was normal; respiration in the cabinet at first treatment twenty-seven, gradually decreasing to twelve at the seventh, to eight at the ninth, to six at the twelfth, to five at the twenty-second, to four at the twenty-fifth, and remained there up to the present time. Began at two tenths rarefaction, increasing to three tenths at the fourth, four tenths at the sixth, six tenths at the eighth, eight tenths at the twentieth, and the

same throughout. Began with one treatment every other day, and kept that up for thirty-seven treatments; then dropped to one a week, and has continued that to the present.

"Treatment commenced November 2d; took the last April 10th. Diagnosis, acute phthisis.

"Yours respectfully,

"R. D. CLARKE,

"F. L. CLASSON."

Dr. W. Everett Smith, of Boston, who has had a cabinet since December, 1885, reports:

"I do not feel justified in reporting as absolutely cured more than this single case, which I send. But this one case is valuable to me, as showing what can be accomplished in treatment. I have others that might be reported, but they are not so striking, nor should I feel justified in speaking so positively in regard to them.

"J. M. E., clerk, aged thirty, has been troubled with asthma constantly for about fifteen years; has always been subject to colds. In the early winter of 1884 had pleurisy in left side; strength and weight so reduced that he had to give up work and spend the winter in the South; was examined at this time by Dr. J. P. Oliver, of Boston, who said he had tubercular phthisis; has never had hæmorrhage or night-sweats, but in December, 1885, when I first saw him, I found his daily work more than he had the strength to accomplish; slight cough and appetite; no bacilli; chest very flat and emaciated, with a marked tender area in right infra-clavicular space; respiratory act feeble; patient gets out of breath easily; percussion revealed slight dullness at both apices. Auscultation showed inspiratory murmur hesitating at both apices, with occasional slight râles; at the right apex in back were very distinct cracklings; there was an abnormal transmission of heart murmur in right subclavian artery; over the third interspace and about two inches from sternum were stridulous râles; vocal resonance not clear over chest, clearer at apices; expansion one inch; diagnosis, incipient consolidation at apices.

"The treatment has been chiefly in rarefied air, with oil of pine-needles, and later with a creasote and camphor mixture.

"First treatment December 24, 1885. Between this date and February 10th had eighteen treatments; has not been treated since March 15th; has had a total of twenty-three treatments. On April 19th I re-examined him, but can find absolutely no trace of dullness or abnormal respiratory murmur. Patient says he never felt or looked healthier in his life; has not hesitated to be out in all weather this winter, even in night air, a thing he has never been able to do before; has had only one cold, and that very slight; has had no asthma since January 14th, although he has several times run for the cars very hard. Does not easily get out of breath now; feels that he is stronger, daily work does not tire him; absolutely no cough, appetite hearty, chest thirty-one inches; but expansion the same; tender area in right infra-clavicular space absent.

"Yours very truly,

"W. EVERETT SMITH."

Dr. C. B. Herrick, of Troy, N. Y., says :

"I will attempt, by the following remarks on a few of my cases of pulmonary troubles which I have treated with the pneumatic cabinet, to give you an idea of what I have done in that line and with what success. Upon receiving my cabinet, I, of course, tried it upon myself as well as on my students and others who had perfect respiratory organs. I found after a few trials, in which we could not breathe against more than four- or six-tenths pressure, that we were enabled easily to allow one inch to one inch and a half to be applied. This extra amount of air thrown into our lungs certainly filled us up, and all tight clothing had to be loosened, and acceleration of the heart's action was noticed and, perhaps with one-inch pressure, a redness of the face was apparent; but the more marked effect was the entire satisfaction of having plenty of air to breathe and no work to breathe it. This effect would continue for some time after coming out of the cabinet. Why, even in perfect health, this acceleration of the heart's action, caused as it is by the undue amount of air introduced into the lungs to be arte-

rialized, its more ready arterialization, and with this all a general activity of all the functions of the body, would not this be a good general tonic, and, of course, a perfect immunity against permanent lung trouble? I think the time will come when people will take their treatment as they now do their Turkish and other baths, and the sooner the time comes the better. Now as to a few of my cases.

"Mr. Nathan M. is a machinist, aged forty-five, coming to me July 20, 1885, with the following history: His father died of phthisis; he contracted a cold some twelve months since, and had one slight hæmorrhage. His physical condition is very weak: weight, 120 pounds; respiration, 30 a minute, very short and labored. His expanded chest is thirty-two inches; ribs prominent; right chest revealed dull percussion throughout its upper half; remainder with left side normal. Auscultation shows a solid infiltration in the upper right lung; remainder and right side comparatively normal, save some bronchitis. He took his first treatment July 30, 1885, at a pressure of four tenths of an inch, using as spray iodine and iodide of potassium; his respirations while in the cabinet fell to eighteen a minute; and after ten minutes' treatment he expressed himself as being able to take a deeper breath than he had in three months; he continued with daily treatments under a gradually increased pressure, until at the sixth he had reached seven tenths; respiration outside of the cabinet was now twenty-two; could walk a long distance without winding. On August 30th, after ten treatments, a re-examination was made.

"A decided change in all the previous conditions; bronchitis absent; percussion dull over left area, more crepitant than mucous râles, showing conclusively a deeper penetration of air in the lungs. He continued daily and tri-weekly for forty-five treatments; his expansion gained one inch, and in weight twelve pounds. Is able to care for himself, and, although not cured, still gave up his treatment, and I have not seen him since.

"Mr. A. G. T., aged twenty-four, weight 128, father and grandfather died of phthisis. He has coughed two years, and has had two or three hæmorrhages. Physical condition fair;

slight build. His symptoms have been raising of mucus, sometimes heavy, and with a daily evening fever. Examination shows chronic bronchitis everywhere, and a muffled murmur on the right side. Percussion obscure; diagnosis, incipient phthisis.

"First treatment July 15th, with two tenths rarefaction and with an iodine and iod. potass. spray; respiration fell two acts per minute while in the cabinet. After the fourth treatment the evening fever began to abate, and on the sixth day had entirely disappeared. His expectoration became more frothy and very easy to raise. He took daily treatments, creeping up to seven and eight tenths, using iodine, bichloride, ammonium hydrochlorate, tolu, etc., as sprays. At the expiration of fifty treatments his respiration was normal, weight increased five pounds, gained one inch in expansion, and is working harder than he ever did in his life before, and without any return of his bad symptoms. Has passed the winter north, while that of 1884 and 1885 had to be spent in Florida.

"Mrs. R., aged sixty-three; mother died of consumption; four maternal aunts died of the same disease. She contracted a cough twelve years ago, and coughed until five years ago, when she had an attack of pneumonitis; since then has been raising very little solid sputa, and been reduced in weight and strength until she is a shadow; has had a number of hæmorrhages.

"Six months since she had a second attack of pneumonitis, which laid her very low, and from which she had never recovered. I saw her during July. At this time the following condition was present:

"The upper lobe of right lung was solid on percussion, and on auscultation devoid of air. The lower lobes had râles of every conceivable nature present; the left side was filled with bronchial râles and evidences of infiltration; inspiration was jerky and accompanied with audible sound; respiration was thirty per minute; her condition was very feeble; coughed hard; expectoration heavy, muco-purulent, with some blood. The first treatment was given her September 1st, with one tenth rarefaction; iodine was used for ten minutes; respiration fell to

twenty per minute; daily and bi-daily treatments were kept up, she being very plucky, and breathing gradually up to six and seven tenths; remaining in the cabinet for from fifteen to thirty minutes. The medication was iodine, bichloride, ammonium hydrochlorate, and tolu; respiration in the cabinet was now, after fifteen treatments, sixteen a minute. In all she took sixty-five treatments, and examination showed an entire absence of râles in the left lung, while those in the right were confined chiefly to the upper lobe. Septum is entirely frothy, no lumps, and diminished in quantity; she is 100 per cent. improved; can walk in the open air unassisted, and has gained five pounds; in expansion she has gained one inch. She left for her home in the country, and has remained in as good condition as when leaving off her treatments. This case especially speaks well for the cabinet. From a mere skeleton, a dying consumptive, she has been brought to look almost the picture of health, is able to care for herself and others as well, and all in a person of her advanced age, and with such a history behind her.

"Miss T., aged twenty-six, came to me, December 21st, with the following condition: A history of pneumonitis from which she never fully recovered; evidence of it yet in upper lobe of right lung. I diagnosed unresolved pneumonitis.

"This patient began with two tenths pressure and ten minutes at a time. She attained in five treatments a pressure of six tenths, and remained thirty minutes in the cabinet. She improved greatly in breathing and all her pulmonary symptoms, and after fifteen treatments she left me, being greatly improved.

"Besides these special cases I have had a number of others which have responded kindly to the influence of the differentiating process, and who were relieved by treatment. Some were in the last stages of phthisis, but the relief obtained was so great that they would come for treatment until physically unable. In all I have been more than pleased with the effect of this truly remarkable scientific apparatus for the treatment of our most formidable disease, phthisis.

"Very respectfully yours,

"C. B. HERRICK."

Dr. W. A. De Watteville, of New York, writes as follows:

"It would be desirable that reports of cases should be more objective in character than is usually the case. Instead of piling up statistics of cases which have been under my care, I prefer to lay before you three types of pulmonary pathological conditions, distinct in regard to their symptoms, and to note the changes produced by pneumo-differential treatment.

"Great accuracy in statement, both as to primary diagnosis and to final results, is necessary, for the primary diagnosis is not so simple as to be free from possible error, and the enthusiastic compiler of his own cases is sometimes apt to make a mountain out of a mole-hill, and record the recovery of a so-called primary infiltration, which, if only a simple catarrh, would have recovered with a week's warm weather and a little cough mixture. If this is not so, how can we explain the wonderful results which appear so often in our journals whenever a new plan for the treatment of phthisis is described? I shall, therefore, detail three cases which, I believe, are fairly representative of their type:

"CASE I.—Miss A. G., aged twenty-six, school-teacher, French nationality, has been in this country for three years; parents both dead, but no phthisical history; had to take a situation as teacher of French in a fashionable school. During the fall of 1884 was exposed to some hardship by overwork and cold room; developed late in the fall a chronic cold; cough; yellow expectoration; loss of appetite; evening fever; loss of flesh and voice; general weakness. Her weight declined from 128 to 98 pounds. She held on to her position until the end of the winter session, and then came to New York to visit friends, and, as she said, to die in peace. She was sent to me to give an opinion as to her chances by pneumatic treatment.

"*Examination*.—Weight 98 pounds, general emaciation, breathing labored, complexion pallid, eyes surrounded by dark rings, temperature 99° to 101°, and pulse feeble.

"*Inspection*.—Expansion, two inches and a half—right side, one inch and three quarters; left side, three quarters of an inch.

A distinct hollow under left clavicle; respiratory movement on left side very limited; right side slightly defective; general nutrition and appetite exceedingly poor. Percussion note fair on right side, dull on upper third of left side, with exception of a circumscribed space below clavicle, where it is super-resonant, and changes its note on changing the position of the mouth.

"Auscultation.—Fine râles and rhonchi on right side, with more or less bronchial breathing; on left side the same symptoms more pronounced; on upper third, expiratory sounds are weak; loud bronchial breathing in apex, with cavernous sounds and gurgling râles under the clavicle. Posteriorly the same symptoms are less distinct.

"Treatment was begun on June 3d, and was repeated daily when the weather permitted it; internal medication was discontinued. The patient was ordered a bottle of Dublin stout at dinner-time. June 10th, objective signs not much changed, a somewhat freer expansion being noticed; voice slightly improved. June 17th, is able to sleep on her back; coughing much diminished, free yellow expectoration, appetite increasing, and night-sweats absent. Râles are coarser in character, and often accompanied with sibilant râles. The respiratory sounds are considerably increased. June 21st, patient had to visit her dressmaker to have her dresses enlarged over shoulders and chest; voice much improved. Is able to take walks and make visits. June 28th, patient can not take treatment on account of heat; appetite not satisfactory; more cough at night and during forenoon. July 5th, treatment has been omitted during heated term; complains of her right side, and can not sleep on it. Appetite not satisfactory.

"Ordered tannate of quinine in five-grain doses three times daily. July 14th, was called to Brooklyn to see patient; she suffered great pain on right side; pulse high, temperature 101° ; find that dry pleurisy has developed over lower half of lung; the patient had that part of the thorax strapped with belladonna strips. July 24th, patient has resumed treatment and feels much better; appetite good. July 31st, improving rapidly; gaining weight fast; appetite excellent; sleeps comfortably on both sides; hardly any cough; voice strong; throat not sore at all;

ordered to come bi-weekly. August 14th, continued improvement; râles, with the exception of the space under clavicle, are absent. No difficulty in breathing. Patient leaves to return to her duties in school; her weight is 112, a gain of 14 pounds. November 4th, patient has come to New York on a visit; she is in excellent health; when very tired, she coughs occasionally, and her voice becomes hoarse. She teaches eight hours daily; her weight is 130, general health excellent, appetite as great as ever. Auscultation still yields the bronchial and cavernous breathing under the clavicle. The heart-sounds are heard still, with equal distinction in the right axilla; a few coarse râles are occasionally met with; there is still the evidence of pulmonary lesion, but the patient is satisfied. March 10th, the patient visits at rare intervals; has followed her onerous duties during the winter, and feels stronger than she has for three years.

"CASE II.—Miss A. B., aged seventeen; weight 120. Examined September 11, 1886. Father died of phthisis. Had pleuro-pneumonia (?) six months ago, and has never felt well since; cough, fever, and night-sweats; no hæmorrhage; loss of appetite and flesh. Was sent into the mountains of New Jersey without benefit. Yellow expectoration; temperature 102° or 103° in the afternoon. Florid complexion; no emaciation in face; thorax emaciated; clavicles prominent, scapulae also; respiration is limited and almost entirely confined to lower thorax and abdomen; the upper part of thorax is almost immovable.

"*Percussion*: The note in the supra- and infra-clavicular and scapular regions is wanting in resonance and is high in pitch; no region of absolute dullness can be found, however. Auscultation shows sharp bronchial breathing, with undulatory expiration present at both apices. Fine crepitant râles accompany the end of inspiration and during the whole of expiration. These symptoms diminish as you descend the thorax; the breathing in upper half on both sides lacks the vesicular character.

"Treatment was commenced September 11th and given four times until the 15th. It was then discontinued for ten days on account of hot weather; was then resumed and continued three

times a week until middle of October, when she left for home. The inhalations used were iodine, sublimate, chloride of ammonium, and salicylic-acid emulsion. The patient made very little progress during the twelve first treatments, and her condition was discouraging. A rarefaction of nine tenths inch was given, when she suddenly began to breathe fully with her upper thorax. From this day steady improvement commenced and continued. State of health at period of dismissal: Free thoracic breathing; bronchial breathing still present, but vesicular element more prominent; râles absent, and expectorates very little; no fever; appetite good; increase in weight not measured, but considerable. Present state of health, as reported last week, is excellent.

"CASE III.—Mr. A. P., a transitory resident in New York city, has been sent on a sea voyage for the benefit of his health; aged thirty-three; phthisical history on his maternal side. Had a severe hæmorrhage three years ago and was sent to Corsica; has been getting progressively worse; May 24th, he shows absolute weakness, unable to mount a stair, harassing cough; sputa thick, yellow, and streaked with blood; temperature 102–103° in the afternoon.

"*Examination*.—Great emaciation; hectic; cheek-bones, clavicles, and scapulae prominent; on right side great depression in infra-clavicular spaces. Percussion-dullness in the apex on both sides; under clavicle there is cavernous resonance. Percussion was painful and had to be abandoned.

"*Auscultation*.—Râles of every character are present. Gurgling sounds accompany cavernous breathing in right infra-clavicular space; treatment was administered with great caution, sublimate and pine-needle oil being used. This was continued for six times at a rarefaction of four tenths inch. Patient derived a momentary benefit as his respiration became easier and the expectoration free. Treatment had, however, to be discontinued, as his temperature rose to 105° every evening of the day he had taken treatment, notwithstanding quinine was used in liberal doses. On discontinuance of treatment, the temperature went down to 101°; patient left for the south of Europe, where he died a few weeks after his arrival. I mention

this case as a corroboration of what I believe you have already published, that not only did the use of the cabinet in this case not reduce the temperature, but gave some cause of inference that the greatly induced circulation produced an increased temperature.

“Truly,

“W. A. DE WATTEVILLE.”

Dr. Robert H. Babcock, of Chicago, writes as follows :

“*April 5, 1886.*

“Herewith I send you a report of two cases which I have treated by means of the cabinet :

“I have used the pneumatic differentiator for three months, chiefly in the treatment of pulmonary tuberculosis, and, although my results have not been brilliant, they are to me encouraging. I shall speak of only two cases. These patients came to the Throat and Chest Department of the South Side Dispensary and were selected because of the hopelessness of accomplishing anything by internal treatment. At the same time the usual internal remedies considered appropriate in such cases were not abandoned upon the resort to the cabinet, and in estimating results this fact must be kept in mind.

“CASE I.—Mary R. gave following history: Aged thirty, Irish, unmarried, a house servant, began to have a dry cough fourteen months ago, and two months later to expectorate. Eight months ago she ceased to menstruate. Her condition has grown steadily worse until present time. She is now tormented day and night by a hard cough and profuse muco-purulent expectoration; is very weak, has daily fever and night-sweats, no appetite, and complains of much pain across the front of the chest; has no diarrhoea. Upon examination of the chest, consolidation of both apices, particularly of the right, was discovered, together with considerable retraction of the anterior border of both lungs. The only râles heard were pleuritic friction-sounds at either side of the sternum. Her temperature was 100° F.; pulse 92, very weak; respirations shallow, but only 20 to the minute. Treatments with the cabinet were begun January 30th, and continued almost daily except Sundays until the 17th of February. She then remained away until March 1st, when

she reappeared with the statement that her menses had returned the 18th of February—that is, the day following her fourteenth treatment. The day of her reappearance her temperature was $99\frac{2}{3}^{\circ}$ F., respiration 18. March 9th, it is noted that she had gained one pound in weight. She now came very irregularly for treatments, receiving only seventeen between March 1st and the 24th of April. She reported considerable diminution in the frequency and severity of her cough, a lessened expectoration, slight improvement in appetite, and entire disappearance of the pain in the front of the chest. She was obliged to work far beyond her strength, sweeping, carrying coal, scrubbing the front steps, etc., all of which tended to retard improvement. After a discontinuance of treatments for a few days she invariably complained of increase in the severity of symptoms, notwithstanding faithful adherence to cod-liver oil and tonics. *Per contra*, she as invariably and emphatically testified to a feeling of relief and amelioration of symptoms after each resumption of treatments with the cabinet. In her case a rarefaction of four tenths was the highest she reached. A spray of the mercurial bichloride of the strength of 1 part in 1,000 was administered, and each treatment lasted about fifteen minutes. A physical exploration of her chest the latter part of March showed no improvement in the physical signs. Although in this case the environment of the patient was so very unfavorable and her treatments were from necessity so intermittent, I am yet of the opinion that the use of the cabinet kept her from losing ground, to say the least. Indeed, it is not beyond bounds to assert that as a whole her condition manifested slight improvement. That this was largely due to the cabinet is rendered probable by the fact stated above, that she always came back complaining of an aggravation of her cough and expectoration after an omission of treatments for several days, while after each return to the cabinet her symptoms became less troublesome.

“CASE II.—Matilda J. gave the following history: Aged thirty-three, Swede, unmarried, domestic, no family history of tuberculosis; was in good health until five months ago, with exception of some acute abdominal affection two years ago, for which she was in a hospital. Last fall she developed a cough

while sleeping in a damp basement. Since then she has lost weight and strength, and is now unable to work. The cough is troublesome and expectoration is copious—muco-purulent. Examination of the chest disclosed slight dullness in the left supra-scapular and supra-clavicular regions, with broncho-vesicular respiration; no râles. Over the right side the resonance was impaired, except under the clavicle, where it had a vesiculo-tympanic ring. Below the angle of right scapula, and passing forward into the infra-axillary region, the percussion note was duller than elsewhere. Here the respiratory sounds were faint and bronchial, being almost obscured by plastic exudation râles. Over other parts of the lung the respiratory sound was broncho-vesicular. Vocal resonance over this side was slightly exaggerated. Her temperature at 2.30 p. m. was $96\frac{2}{3}^{\circ}$, pulse 78, and respirations 21. The diagnosis was plastic exudation upon the pleura, with slight induration of right lung and slight tubercular induration of the left apex. Treatments with the cabinet were begun March 4th, while at the same time cod-liver oil and tonics were continued. March 15th, after eight treatments, each of fifteen minutes' duration, together with a spray of Lugol's solution, five per cent, the patient's cough had lessened considerably; she felt better generally, with less sense of constriction in the chest. By March 27th, after nine more treatments, she no longer complained of any trouble with her breathing, and her expectoration had become mucous. Her appetite had improved somewhat. At the date of this writing, April 6th, after eight more treatments, her general condition is manifestly improved, and she reports a gain in weight of one pound. Examination of the chest, however, reveals no apparent improvement in the physical signs, except that her ability to expand the chest is greater than a month ago, and the respiratory sounds are more audible. The râles remain as before.

"These two are the only cases in which the treatments were continued by the patients with any degree of faithfulness, and hence they are the only ones I report. As said already, the results are not brilliant, possibly not more favorable than it might be claimed would be obtained by proper hygienic and

therapeutic management. Nevertheless, from these and my limited experience in my other cases I derive considerable encouragement. I should not think of relying on the cabinet to the exclusion of all other measures; it is in my opinion a valuable adjunct, and, indeed, it will help the patient acquire what he can not get alone—viz., the ability to inflate his lungs to an extent previously impossible. The benefit of this alone is too apparent to need discussion. This is of very great service in exactly those cases of plastic exudation upon the pleurae to the disastrous consequences of which Dr. Leaning has called attention, and in which he recommends that the patients be directed to breathe as deeply as possible. In every instance of pulmonary phthisis I have noted the decided effect of this treatment in lessening cough and expectoration where the former was due to collection of secretions within the bronchi and not to laryngeal complications. Whether this be due to the increased force of the respiratory act alone or to the efficient administration of atomized solutions, which this method renders possible, this influence over cough and expectoration is of such marked benefit as to alone recommend the method. Without wishing to depreciate the value of the topical medication so efficiently achieved by means of sprays used with the cabinet, I am yet inclined to think that the benefit is mainly due to the mechanical effect of the treatment in causing a more active intra-pulmonary circulation, combined with the stimulation of the mucous membrane of the larger bronchial tubes, caused by the more rapid passage over it of the air-current. Not only is the circulation within the pulmonary arterioles accelerated, thus bringing more blood into contact with the oxygen of the inspired air, but that in the bronchial and nutrient vessels is also hastened, a tendency to stasis within them is diminished, the bronchial mucous membrane is kept in a healthier state, the absorbents perform their function more actively, and the nutrition of the lung structure is improved. Were this alone and nothing more the result of treatments with the pneumatic cabinet, this were enough to recommend it to the profession.

“ROBERT H. BABCOCK.”

Dr. E. L. Trudeau, of the Cottage Sanitarium, Saranac Lake, says :

"So far as I have gone I can bear testimony to the usefulness of this mode of treatment in certain forms of pulmonary diseases. It has seemed to me most beneficial in those phthisical cases where most good might be expected from expansion and consequent improved pulmonary nutrition, and that the results are much less satisfactory where localized antiseptic treatment has seemed the first indication to be fulfilled. Briefly, in incipient phthisis with apical lesions and slight constitutional disturbance, and in the various forms of chronic phthisis, but especially where malnutrition, debility, and dyspnea are principally dependent on the evil effects of the contraction of connective tissue in the lung, its most brilliant field of usefulness is to be found. In rapidly advancing excavation and in scattered tubercular lesions it is of little avail. Most patients coming under the head of incipient and chronic phthisis treated by this method at the Saranac Lake Cottage Sanitarium showed more or less marked improvement. In one case a gain of seventeen pounds weight with an entire disappearance of all moist sounds in the lung occurred. Under its use, weight, breathing power, digestion, and occasionally cough improved; it had less effect on the fever and expectorations; slight hæmoptysis occurred in one case only. Very numerous observations showed that the tubercle bacillus and the putrefactive bacteria in the expectoration were generally unaffected by inhalations of 1 to 1,000 bichloride of mercury and five-per-cent. solutions of carbolic acid even when such treatment was continued for several months. In one case the tubercle bacillus disappeared temporarily. The study of this case, however, is still uncompleted.

"E. L. TRUDEAU."

Dr. Fernald and Dr. Cutts, of Washington, D. C., who have been using a cabinet for the past three months, write that, while they have treated a number of cases, sufficient time has not elapsed to justify them in making a general

report. They have had one case, however, which they report in full :

"Sophie S., white, aged eighteen, single; seen by us for the first time March 16th, with following history: Has been losing flesh and strength for six months, during which time she has had an annoying cough, night and day; considerable expectoration, muco-purulent in the morning, at other times frothy and white; five months ago had one slight attack of hæmoptysis; slight daily hectic for last few weeks; night-sweats every night for past week; about middle of January applied at a dispensary for treatment for amenorrhœa; appetite fair; digestion good; sleep restless.

"*Family History*.—No phthisis; one uncle has asthma; father died of pneumonia.

"*Inspection*.—Fairly nourished; complexion sallow; under left angle of jaw an old cicatrix from serofulous glands; no depressions or deformity of chest; both sides alike; heart normal; pulse, 90; respiration, 25; temperature, 99·8°, 4.30 p. m.; weight, 102.

"*Palpation*.—Slight increase of vocal fremitus below the left clavicle as far as upper border of second rib, and within mammary line.

"*Percussion*.—Slight dullness over the above-mentioned area and above the clavicle in addition.

"*Auscultation*.—Slight increase of vocal resonance over the dull area; jerky respiration (both inspiration and expiration) over whole upper third of left lung; abundant fine mucous râles and an occasional sibilant râle in same lung, in supra- and sub-clavicular space and in supra-scapular region.

"*Treatment*.—In addition to the treatment by the cabinet, she had been taking phosphatic emulsion for two months before coming to us, and continued to do so for two weeks later; by our advice she has taken a simple bitter before meals; at one time, early in the treatment, quinine was thoroughly tried to eliminate intermittent fever as a cause of the daily rise of temperature, but it had no controlling effect, and was afterward discontinued.

"She has had daily sittings except on a few occasions, when kept away by rain; has had thirty sittings to date; from the fourth to the twelfth sitting a preliminary rarefaction was made of two and a half inches for five minutes; since the twelfth, two inches for five minutes. Creasote was used in the spray for first nineteen sittings; since then Lugol's solution, either alone or with creasote; and on several occasions a few drops of pine needle extract have been added. Patient breathed against one tenth of an inch for three minutes at first sitting; at each time after this the rarefaction was gradually increased until, at the eighth sitting, was able to breathe against four tenths for eight minutes; for the last eleven sittings, eight tenths for twelve to fifteen minutes, which seems to be as much as she can endure. Her condition began to improve from the first; has had no night-sweat since the third sitting; after the eighth sitting, has had practically no cough or expectoration; fever has gradually diminished, and for last ten days has had none; at no time since treatment began has temperature been found by us, at time of sitting, above 99.8°; at the eighteenth sitting she had gained two pounds, was sleeping and eating better, and in fact was better in every way. Her condition continued to improve, and at the twenty-seventh sitting her weight was one hundred and ten pounds, having gained eight pounds since her first treatment. Her complexion is clearer and her whole appearance is brighter and healthier. An examination of chest was made on the 24th instant (thirtieth sitting). Both sides of chest normal in every respect, except that jerky respiration at the upper part of left lung remains, but is now heard only on inspiration, and is confined to a more limited area.

"Respiration reduced to twenty on outside and eighteen inside cabinet.

"Yours very truly,

"H. M. CUTTS,

"F. C. FERNALD."

Dr. J. H. Blanks, of Meridian, Miss., sends a tabulated statement of twenty-seven cases, with diagnosis and result, and a sketch of two cases as follows:

	No. of cases.	Recov-ery.	Im-prove-ment.	No im-prove-ment.	Deaths.
Bronchitis	12	9	2	1	
Asthmatic bronchitis	1	.....	.....	1	
Acute phthisis, first stage	3	1	1	1	
" " second stage	1	.....	1		
" " third stage	4	.....	.....	.....	4
Chronic phthisis	4	.....	3	1	
Unresolved pneumonia	2	1	1		
Total	27	11	8	4	4

"The cases reported in the death-list were all advanced. The patients were unable to walk unaided, greatly emaciated, with large cavities, and an evening temperature from 103° to 105°. One of them was under treatment four days only. The three others were greatly benefited. They expectorated freely after each application, could breathe easily, and were very much aided in procuring sleep. They were always greatly disappointed when they were prevented from any cause from receiving treatment, as they said they could breathe and sleep so much better.

"The history of one case of phthisis, under head of improvement, is as follows:

"Mr. M., aged twenty-two; best weight one hundred and fifty-eight; present weight one hundred and seventeen. Two brothers died of consumption and one of supposed pneumonia. Patient contracted measles sixteen months ago, since which has had a cough. Eight months ago had several hæmorrhages, and has rapidly declined since. He was first seen by me December 15, 1885, when the following notes were recorded:

"*Inspection*.—Shows marked depression in left subclavicular space.

"*Palpation*.—Increased vocal fremitus left side.

"*Percussion*.—Left side: forcible percussion shows tympanic quality about third intercostal space; posteriorly there is dullness.

"*Auscultation*.—Left lung anteriorly shows marked an-

phoric respiration in subclavicular region, and gurgles heard at forced expiratory effort. His temperature was 102° ; pulse, 100; respiration, 30.

"*Treatment.*—He was placed in the cabinet, and breathed against two tenths of an inch fall of the barometer for fifteen minutes, inhaling a one to one thousand mercuric bichloride solution; next day, three tenths of an inch pressure, and was gradually increased daily till eight tenths was reached, at which he continued throughout the course of treatment.

"*December 19th.*—Temperature, 102° ; pulse, 100; respiration, 28.

"*23d.*—Temperature, 100° ; pulse, 90; respiration, 26.

"*28th.*—Temperature normal; respiration, 24; pulse, 86.

"*January 20th.*—He feels 'as well as he ever did in his life.'

"He now weighs one hundred and twenty-five pounds—a gain of eight pounds in thirty-five days.

"*February 15th.*—Continued improvement, but still has a 'slight cough.'

"Physical examination now discloses absence of moisture in the cavity. Posterior dullness cleared up.

"*March 1st.*—Expresses a desire to resume his work as a laborer. Treatment now to be three times a week.

"*April 1st.*—Cough more troublesome, but feeling well.

"*12th.*—Left for southwestern Texas, to engage in work as a laborer.

"The case of acute phthisis reported as cured had the following history:

"Mr. J., aged thirty-four; best weight, one hundred and thirty-five; present weight, one hundred and fifteen. Mother died of consumption. Had cough about two months, accompanied by free expectoration and slight fever in afternoons, rapid emaciation, general weakness, etc. For several weeks had an evening temperature of 101° . He was first seen by me December 24, 1885. His general appearance was that of anæmia; slight depression of infra-clavicular region left side. Increased vocal fremitus, slight dullness, puerile respiration on right side, etc. Thirty applications were made, when his cough ceased,

dullness cleared up. He is now (April 25, 1886) perfectly well, and has regained his normal weight."

Dr. A. S. Houghton, of Chicago, says:

"The report of cases treated by me in the pneumatic cabinet, as published in the 'Journal of the American Medical Association,' November 7, 1885, is amended to read as follows:

	No. of cases.	Recovery.	Improvement.	No improvement.	Deaths
Chronic bronchitis	9	5	1	3	
Asthmatic bronchitis	2	1	1		
Spasmodic asthma	2	1	1		
Acute phthisis, first stage	12	6	5	1	
" " second stage	4	.....	1	1	2
" " third stage	6	1	1	1	3
Chronic phthisis	7	1	1	3	2
Unresolved pneumonia	1	.....	1		
Total	43	15	12	9	7

"Of the nine patients unimproved, seven took less than three treatments. The three reported as recovered last November are in perfect health to-day. No. 3, about whom there was some dispute, called on me January 4th, reporting herself as having been free from cough since September; able to sing every day, as required by her profession, and weighing 146 pounds, a gain of twenty-one pounds since I first saw her. She wrote me April 18th as follows: 'I am still enjoying good health; weigh 140.' That is what I understand by the term recovery. The two other patients are discharged and are in good health, one gaining seventeen and the other eleven pounds. Of the five improved, three are in California.

"A. S. HOUGHTON."

Professor James T. Whittaker, of Cincinnati, in closing the discussion upon the paper recently read by me before the American Medical Association, informally reported on cases treated by him with this process. He had found its effects pronounced and satisfactory. He spoke of patients

with tuberculosis who had recovered. He declared that patients incapable of recovery became fascinated with the treatment, and it was necessary in many instances to restrain their demands for its administration when unwarranted, except by their desire. He declared himself an enthusiastic adherent of the pneumatic differential process, which he considered of inestimable value.

Dr. Whittaker is reported as having said, in a discussion before the Kentucky State Medical Society, that pneumatic differentiation had, he thought, entirely changed the prognosis of tuberculosis.*

Recognizing first the importance of systematic microscopical examination of plithisical sputum, secondly the wide numerical variation of bacilli on two slides of the same material, and third the difficulty of expressing their numerical value for comparison, Mr. Ketchum, who has conducted these examinations, has adopted the following system :

A comparatively equal distribution of bacilli is accomplished by a thorough trituration of the sputum for ten minutes in a sterilized mortar. Each examination consists of the thorough survey of six slides, three of which have been stained by the Ehrlich method as a test, and three by a modification of the Rindfleisch method. Exact values, based on number of individuals to given areas after the blood-corpuscle method, are impracticable, owing to the time necessary, and the impossibility of getting all bacilli in a given field in the same optical plane; consequently a table of estimated values has been established as follows: One, is occasional; two, medium; three, numerous; four, large quantities; five, *en masse*. Specimens have been identified by numbers and not by name of donor, so that an unprejudiced estimate could be made.

* "Gaillard's Med. Jour.," Aug., 1885, p. 208.

These examinations have shown increase, decrease, or absence of bacilli coincident with progressive symptoms, improvement, or absolute quiescence. In Cases IV and VIII of my report the evidence is corroborative of an inherent antagonism between the *Bacterium termo* and the bacillus of tuberculosis. So far as they go, they substantiate the advanced reports of Professor Cantani, of the Turin biological laboratory.

I am sensible of the incomplete manner in which I am obliged to record interesting data in many of these cases. Taken in conjunction with my previous report, they will be seen to supply some deficiencies there existing. My original position with reference to the pneumatic differential process seems substantiated. Numerous possibilities will demand close attention and prove a fruitful source of study and application. Some of these I have pointed out in a paper which I had the honor to present recently to the American Medical Association in St. Louis.* Certain facts have been demonstrated. Let them stimulate us to further accomplishment.

252 MADISON AVENUE, NEW YORK.

* "Jour. of the Am. Med. Assoc.," Aug. 14, 1885.



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